REMARKS

With entry of this Amendment, claims 1, 5-7, 32-38 and 51-52 are pending, claims 39-50 are withdrawn and claims 2-4 and 8-31 are cancelled. Reconsideration is respectfully requested.

Objection to the Specification (Office Action, ¶ 4):

The Amendment filed on 13 November 2007 is objected to by the Examiner under 35 USC §132(a) because it allegedly introduces new matter. The Examiner asserts that there is no full support in the original disclosure of either the instant application or App. No. 10/726,744 for the following sentences: "It will be recognized by those skilled in the art that other embodiments may include multiple n-type thermoelements in parallel with each other and in series with a single p-type thermoelement, or alternatively multiple n-type thermoelements in parallel with each other and in series with multiple p-type thermoelements. These and other embodiments would fall within the spirit and scope of the present disclosure."

While Applicants believe that this allegation is incorrect, Applicants have removed the identified language from the specification and inserted other language taken virtually verbatim from the specification of Application No. 10/726,744 (FIG. 14 and description thereof as well as from original claims 11, 16 and 24, part of the original disclosure per MPEP §608.01(l)) all of which was incorporated by reference in the present application as filed. Withdrawal of the objection is respectfully requested.

Rejection of Claims Under §112 (Office Action, ¶ 6):

Claims 1, 5-7, and 31-38 are rejected under 35 USC § 112, first paragraph, as failing to comply with the written description requirement. The claims allegedly contain subject matter that is not supported in either the original specification of the instant application or the specification of Application No. 10/726,744 for a plurality of p-type thermoelements being connected in parallel to each other and in series to a plurality of n-type thermoelements as provided for in amended claim 1 at lines 23-25. This contention is incorrect.

As discussed above, support can be found in the specification of Application No. 10/726,744 (especially original claim 11, part of the original disclosure per MPEP §608.01(l)) all of which was incorporated by reference in the present application as filed. Withdrawal of the objection is respectfully requested.

Rejection of Claims 1, 5-7, and 31-34 Under §103 (Office Action, Para. 10):

Claims 1, 5-7, and 31-34 are rejected under 35 USC § 103(a) as allegedly being unpatentable over Migowski (WO 89/07836) in view of Bass (US 6,207,887). This rejection is traversed.

The Claimed Combination is Improper

The Examiner acknowledges that Migowski does not disclose the claimed series-parallel configuration. Bass is cited by the Examiner as allegedly making up for this deficiency in Migowski. This proposed combination is improper as the Bass referenced feature (the series-parallel configuration) could not be combined with Migowski to produce an operable device for providing power as recited in the claims of the present application or even as disclosed in Migowski.

Bass discloses a series-parallel connection using monolithic block and/or wafer construction separated by a plurality of insulating separating layers. That is, it is a large 3-dimensional device with multiple layers 4 of alternating p-type and n-type thermoelements separated by insulating layers of Kapton. (See, e.g., Col. 6, lines 6-14, and lines 53 through Col. 3, lines 62; Figs. 1 and 6 – shown herein).

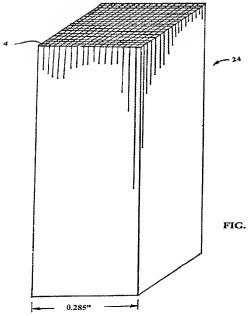

FIG. 1

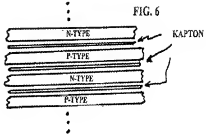

FIG. 6

The Migowski device is essentially a 2-dimensional power device formed on a thin substrate wherein the p-type and n-type thin film elements are formed thereon and connected to one another in series via overlap of a portion of each thin film (p. 2, 3rd full para.; p. 2, last para.; Figs. 2 and 4 shown herein). Migowski states that the substrate and thin films are manufactured to be rolled up for use in small devices, such as watches (p. 3, last sentence of carry over para. of p. 2).

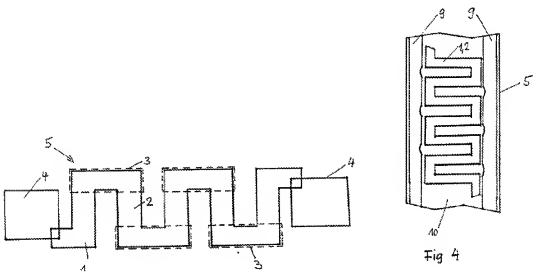

Fig 4

The Examiner states that it would have been obvious for one of ordinary skill in the art to modify Migowski with the series-parallel connections taught by Bass. Applicants respectfully disagree.

As the Examiner knows, for such a holding of obviousness the combining of prior art elements according to known methods must yield predictable results. "[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does." *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1396 (2007). If any of these findings cannot be made, then this rationale cannot be used to support a conclusion that the claim would have been obvious to one of ordinary skill in the art. MPEP § 2143.

In the present case, no one of ordinary skill in the art would have attempted to combine the monolithic (three-dimensional) block series-parallel approach of Bass with the flat (two-dimensional) Migowski device to come upon Applicants' claimed method and device and nothing in either reference indicates such a combination would be possible or would yield predictable results. The mere fact that references can be combined or modified (which does not even appear to be likely between Migowski

and Bass) does not render the resultant combination obvious unless the results would have been predictable to one of ordinary skill in the art. *KSR*, at 1396 (2007). MPEP § 2143.01.

Even if, *Arguendo*, Such a Combination were Proper, the Interdependency of the Elements in Applicants' Claim Renders the Claimed Methods Non-Obvious

As recited in claim 1, the claimed method includes in part, a thermoelectric generator comprising a plurality of p-type and n-type thin film semiconductor thermoelements formed on a single flexible substrate wherein a single p-type thermoelement is, or a plurality of p-type thermoelements in parallel with each other are, electrically connected in series with a single n-type thermoelement or with a plurality of n-type thermoelements in parallel with each other.

The presently claimed invention recognized the importance of having both the series/parallel configuration and a single flexible substrate. Such configuration formed on a single flexible substrate provide the ability to tailor the output of the power source device to produce a wide range of voltage and current to suit a variety of possible desired applications. Specifically, the array of p-type and n-type thermocouples are tailored in the present invention by varying the deposition process and thermoelements configurations as the thin films are formed on the substrate so as be able to custom design each thermoelectric generator. In addition, the thermoelement configuration formed on a single flexible substrate allows for optimizing the L/A ratio of the thermoelements within the deposition chamber (advantages of the L/A ratio are discussed in the specification and below). These tailoring abilities provide superior versatility because any internal conducting element can be made a parallel or series bridge to nearby elements before the assembly leaves the deposition chamber thereby providing higher reliability and reproducibility than can be achieved by the Migowski or Bass disclosed methods/devices.

As such, neither Migowski nor Bass recognized the importance of the combination of said recited claim elements and thus, clearly the proposed combination was not obvious to one of ordinary skill in the art. In fact, only through the use of impermissible hindsight could one develop such a proposed combination.

For at least these reasons, claim 1 and those dependent therefrom are allowable over the art of record. Based on the same basic argument, new claim 52 is also allowable over the art of record.

Claims 34 and New Claim 51 are Allowable Over the Art of Record because No Reference Cited Teaches or Suggests the Recited Length to Area Ratio

The Examiner acknowledges that neither Migowski nor Bass teach or suggest a method using a device wherein each of the p-type thermoelements and the n-type thermoelements has a length to area ratio of between from about 1,000 cm^{-1} and to about 10,000 cm^{-1} but asserts that such is merely a design choice as a matter of dimensions (Office action p. 7). This assertion is incorrect.

As stated in Application No. 10/726,744, which application is incorporated in its entirety in the present application, Applicants determined through testing that a key parameter affecting the voltage produced by the thermoelements is the length-to-area (L/A) ratio of the individual thermoelements, where A is the cross sectional area of a thermoelement. Applicants noted that current monolithic (or discrete element) modules are characterized by L/A values of less than about 20 cm^{-1}. Applicants provide particular L/A ratios so to achieve a design power output at a large enough voltage to be directly applicable to devices needing power, without having to provide voltage amplification. The arguments in the case cited by the Examiner, *Gardiner v. TEC Systems, Inc.*, do not apply to the presently claimed methods because the dimensionalities taught by Applicants as being preferable critically govern the difference between acceptable and non-acceptable output of the method/device.

As such, the choice of L/A ratio clearly is not merely a dimensions choice but has extensive effect on the resulting voltage produced by the power source. Neither Migowski nor Bass nor any other reference of record, recognized the importance of such a ratio and as such, the proposed claimed methods are not obvious and are allowable over the art of record.

Rejection of Claims 35-38 Under §103 (Office Action, Para. 11):

Claims 35-38 are rejected under 35 USC § 103(a) as being unpatentable over Migowski and Bass et al as applied to claims 1, 5-7, and 31-34 above, and further in view of Simeray et al. (US 6,340,787). Applicants traverse this rejection.

The Examiner is in error asserting that Simeray's thermally conductive stake (74 in Figure 6) is a heat pipe. Simeray makes no reference to use of a heat pipe. A thermal stake such as shown in Simeray using simple heat conduction would not be effective (as would a heat pipe) in bringing low quality ambient heat to a thermoelectric generator. Accordingly, no reference cited teaches such a heat pipe and Simeray does not make up for the deficiencies of Migowski or Bass.

Applicants believe the claims recited in the subject application are allowable over the art of record and notice to that effect is respectfully requested.

Request for Interview

If any issues remain, the Examiner is hereby formally requested to contact the undersigned attorney prior to issuance of the next Office Action in order to arrange a telephonic interview. It is believed that a brief discussion of the merits of the present application may expedite prosecution. This request is being submitted under MPEP § 713.01, which indicates that an interview may be arranged in advance by a written request.

Respectfully submitted,

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